

# (12) United States Patent

# Ishii et al.

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# (54) ILLUMINATION APPARATUS WHICH IS ARRANGEABLE SO AS TO SURROUND AN IMAGE CAPTURING LENS

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### (58) Field of Classification Search

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See application file for complete search history.

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#### (57)**ABSTRACT**

The illumination apparatus includes a light collector directing light from a light source, radially inward further than the light source, and a light guider provided radially inside further than the light source so as to circumferentially extend and guiding the light from the light source toward an area extending to a side away from the light source and causing the light from the light source to exit toward a light projecting direction. The light collector includes two reflective surfaces on a light projecting direction side and on an opposite side thereto in the thickness direction, and a light exiting opening between the two reflective surfaces. In a sectional plane along the thickness direction, a direction of a center of a light exit range from the light collector tilts to the opposite side to the light projecting direction side.

## 42 Claims, 30 Drawing Sheets

